PROGRESS REPORT: VIRGINIA INVASIVE VEGETATION MANAGEMENT FISCAL YEARS 2000/01

EXECUTIVE SUMMARY

The NRPP-funded Virginia invasive vegetation management team was tasked with assessing invasive plant problems at participating VA-Subcluster parks[1], creating strategic plans, obtaining NEPA/NHPA clearance for controls, initiating controls against targeted invasives, assisting parks with site restoration, and moreover, creating a sustainable program that survived beyond the NRPP funding period. Accomplishments include:

FY 2000 Accomplishments:

- Field reconnaissance and initial assessments were completed at all eight parks.
- Strategic plans for managing alien invasive vegetation were completed and adopted at seven parks. All eight parks completed NEPA/NHPA clearance for site-specific action.
- Staffs that were tasked with protecting natural and cultural resources worked together toward a common goal of reducing alien species impacts.
- On-the-ground treatments began at all parks amounting to 147 acres of initial controls and retreatments by the VIVMT and an added 145 acres of independent work by parks, totaling 292 acres.
- Training of participating park staffs by VIVMT specialists began at all parks during both the assessment and control/monitoring phases. Training included species identification, integrated pest management, and specific control techniques.
- Monitoring plots were established at three parks.
- Organizational capacity increased at all eight parks by acquiring tools for efficiently implementing invasive vegetation management.

FY 2001 Accomplishments:

- On-the-ground treatments continued at all parks amounting to 550 acres of initial controls plus retreatments by the VIVMT and an added 768 acres of independent work by parks, totaling 1,318 acres. For the two-year effort, exclusive of park efforts, VIVMT provided control on 422 acres. Treatment and re-treatment amounted to 697 acres.
- Site restoration at three parks (planting/seeding native species) amounting to 12.1 acres.
- Monitoring plots were established at four additional parks to aid treatment effectiveness analysis and species monitoring.
- Training continued via on-the-job interface with VIVMT/local park staffs as well as professional training conferences. Park staffs at each park were mobilized to effectively identify current and potential highly invasives plants. Training and transferring technical knowledge took place regarding invasive control techniques, monitoring, and safety issues.
- Organizational capacity was augmented through purchase of essential tools, supplies, and training, as well as by transfer of knowledge and program intent as listed above.
- Public awareness of invasive problems was increased through a series of articles, posters, speeches, and handout materials. These efforts were aimed at the general public, park neighbors, professional peers, and in-park staff.

[1] Participating parks included APCO, BOWA, COLO, FRSP, GEWA, PETE, RICH, and SHEN.

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INTRODUCTION

The Virginia Invasive Vegetation Management Team, a FY 2000/01 NRPP-funded project, helped eight parks within the Virginia Subcluster recognize, assess, treat, and monitor invasive non-native vegetation. Participating parks included APCO, BOWA, COLO, FRSP, GEWA, PETE, RICH, and SHEN. The broader project intent was to restore native ecosystems. The project team was composed of representatives from each park, a project manager, and four hired employees. Linking with local park staffs increased the overall effectiveness. To the extent that linkage occurred, more ground was surveyed and treated.

The project goals were as follows:

- Assess situation and create strategic plan of control, restoration, and monitoring [for each park].
- Begin eradication or control of targeted alien populations.
- Assist parks with site restoration efforts to achieve sustainable plant communities.
- Create a sustainable program that survives beyond the NRPP-RM funding period.

Each of the goals was vigorously addressed during the period. By FY 2000-end, assessment and planning was accomplished for all parks via strategic plans or individual project clearances, including NEPA/NHPA considerations. On-the-ground treatments commenced that year. Preparation for site restoration began in the form of purchasing planting materials. Finally, sustainability was addressed by growing organizational capacity in the form of technical expertise transfer, procurement of essential field tools and supplies, and establishing park policy for invasive vegetation management. Refer to the October 2, 2000, *Progress Report* for detail.

FY 2001 focused on treatments, re-treatments, effectiveness monitoring, public outreach, and furthering organizational capacity. This report will address these points and summarize project accomplishments as a whole.

PARK ASSESSMENTS & PLANNING

Planning & Review

The Project Manager and one SHEN seasonal employee began conducting site assessments with local staffs in September 1999. With guidance, park staffs continued field reconnaissance after the initial visits. They addressed questions of species presence and epicenter locations. COLO, PETE, and SHEN gathered GPS documentation of sites for precise mapping and follow-up treatments the first year. FRSP, GEWA, and RICH joined in the effort in the second year as they obtained GPS equipment. Excellent cooperation and local park energies kept the assessment phase proceeding at a brisk pace. The Project Manager led the planning effort by providing initial analysis of park-specific data and coordinating with park staffs to gather essential pieces of information for the planning process and documentation.

Unlike so many cases of program planning where the participants view the process as a hindrance from "getting the job done," there was active participation and real interest in strategizing and learning about invasives during the process. Planning provided the stage to achieve greater understanding, not merely satisfy an administrative need. Each park's plan formed a rallying point from which to strategically address what prior had seemed an overwhelming situation. Indeed, each park has sizable invasive vegetation problems, but the process of assessing and prioritizing potential treatment areas while gathering regional best management practice protocols armed us all to move forward. Local staffs provided input on zonal treatment considerations and natural/cultural resource protection concerns. (The next subsection addresses the prioritization process.) Local park resource specialists ensured that the draft plans received appropriate review and change comments from the perspectives of maintenance, cultural resource protection, and public safety and Ranger activities.

An example of a park strategic plan outline is provided in the appendix. What follows is a table of planning activities and accomplishments.

Table-1. Planning activity.

Parks	Field Visitation Initiated	Analysis Initiated	Strategic Plan or Site Projects Approved
APCO	9/28/1999	8/2000	**9/19/2000**
BOWA	9/28/1999	10/1999	**4/19/2000**
COLO	9/29/1999	12/1999	**5/25/2000**
FRSP	11/23/1999	3/2000	**6/02/2000**
GEWA	9/23/1999	11/1999	**4/20/2000**
PETE	9/8/1999	11/1999	**7/20/2000**
RICH	10/19/1999	11/1999	**9/05/2000**
SHEN	5/1997	12/1999	**9/22/2000** [2]

Targeting Invasive Species

Each park arrived at their subset of targeted invasive species through a four-tiered prioritization approach. Field data reconnaissance provided a first run at winnowing. Though Virginia has hundreds of non-native species, certain species are known to be highly invasive and of particular threat to preserving natural and cultural resources. For instance, dandelion and English plantain

[2] Included a series of species- and zone-specific project approvals with accompanying NEPA/NHPA clearance.

were not considered to date though their presence is virtually universal in turf and forest edge settings. Second, once the field data was collected, the NPS *Handbook for Ranking Exotic Plants for Management and Control* by Hiebert & Stubbendieck was used to correlate potential environmental impacts with potential for treatment success. Localized conditions and species presence information was incorporated into the system. A ranking was created where species with the highest potential for negative environmental impacts and highest likelihood for control received priority. Third, species and epicenter priorities were adjusted for natural resource and cultural/historical protection concerns. For instance, areas containing rare habitat had higher priority for protection that other areas. Lastly, priorities were adjusted for operational practicality. Certain epicenters might be combined with others to aid fieldwork efficiency though one might not rank highly of its own merit as an example. The following species were identified and prioritized for treatment at each park.

Table-2. Targeted invasive species for each park within the VA Subcluster.

Parks	Targeted[3] Invasive Species[4]
APCO	Tree of heaven, princess tree, mimosa tree, privet, multiflora rose, Johnson grass, Japanese honeysuckle, giant mullein, crowned vetch
BOWA	Kudzu, tree of heaven, Johnson grass, Japanese honeysuckle, gorse, Japanese stiltgrass
COLO	Tree of heaven, princess tree, privet, Asian bamboo, kudzu, Oriental bittersweet Japanese knotweed, Phragmites, English ivy, non-native wisteria, Japanese honeysuckle, mimosa
FRSP	Tree of heaven, multiflora rose, periwinkle, Japanese honeysuckle, English ivy
GEWA	Autumn olive, Phragmites, English ivy, periwinkle, non-native grasses, Japanese honeysuckle, giant mullein, multiflora rose
PETE	Tree of heaven, Johnson grass, privet, Japanese honeysuckle, periwinkle, Asian bamboo, mimosa
RICH	Tree of heaven, privet, mimosa, Japanese honeysuckle, Oriental bittersweet, princess tree, English ivy, Johnson grass, multiflora rose
SHEN	Oriental bittersweet, Japanese knotweed, Johnson grass, giant mullein, princess tree, tree of heaven

FIELD ACTIVITY

Strategy

The strategic approach for treatment planning was to maximize accomplishment of identifiable units. We treated species or epicenters that promised full eradication within the project scope rather than focusing on large problems where only incremental headway was possible. An expression of that was to treat early infestations of species and smaller distinct areas rather than well-advanced infestations and larger, indistinct areas. This was practical in the short-term as a means to kick-start the management program. By "picking low-lying fruit," we were able to prove value for the committed NRPP project funding. Where possible, this approach allowed us to take on projects that, with follow-up, truly eradicated infestations from the parks and reduced overall load. The approach was balanced by the long view for program sustainability. Everything about our inter-park communications and expenditures aimed at the goal of sustainability.

[3] Includes targeted invasives only, not all nonnatives.
[4] Refer to the appendix for a linked listing of species' common and scientific names.

Site Restoration

Invasive Controls

In this early phase of site management, the great majority of site restoration activity was spent controlling invasive species with less time for soil preparations and planting. The following table summarizes the area being treated at each park. As is often the case, many sites needed initial and one-to-three follow-up treatments to achieve full invasives control. The nature of highly invasive species is that they are able to withstand one or more *killing events* through such mechanisms as underground tubers/rhizomes, stump sprouting, and dormant seed in the soil, among others. These factors, along with lack of natural controls, give them competitive advantage in the first place. Comparing the infested land area actively managed by VIVMT (422 acres) to the acres they treated (697 acres) indicates retreatments occurred at many sites. Summaries of VIVMT and local staff fieldwork follow. VIVMT park-specific detail is available in the appendix.

Table-3. VIVMT treatment areas within the Virginia Subcluster.

Park	Ground Area Under Treatment by VIVMT (Acres – FY 2000/01)
APCO	47
BOWA	67
COLO	37
FRSP	27
GEWA/THST	30
PETE	123
RICH	28
SHEN	63
Total	**422**

Table-4a. VIVMT and local park invasive plant treatment activity – FY 2000.

PARK	Treatment Activity[5]					
	VIVMT		Park		Total	
	Hours	Acres	Hours	Acres[6]	Hours	Acres
APCO	290	5	20	--	310	5
BOWA	380	55	102	15	482	70
COLO	400	6	38	--	438	6
FRSP	280	13	9	--	289	13
GEWA	320	11	1	--	321	11
PETE	240	45	84	--	324	45
RICH	280	4	44	--	324	4
SHEN	140	6	2680	130	2820	136
Administrative	418	--	NA	NA	418	--
Total	**2748**	**~147**	**2978**	**145**	**5726**	**~292**

[5] Includes treatment and retreatment acres.

[6] In many cases, park staffs worked side by side with the VIVMT crew. Acres are therefore accounted in the VIVMT column. Independent action is accounted in this park acres column.

Table-4b. VIVMT and local park invasive plant treatment activity – FY 2001.

PARK	Treatment Activity[5]					
	VIVMT		Park		Total	
	Hours	Acres	Hours	Acres [6]	Hours	Acres
APCO	680	76	4	--	684	76
BOWA	320	66	143	19	463	85
COLO	760	61	16	--	776	61
FRSP	960	41	2	--	962	41
GEWA/THST	760	46	15	--	775	46
PETE	920	170	253	6	1173	176
RICH	740	47	7	--	747	47
SHEN	880	45	6000	743	6880	788
administrative	1608	--	NA	NA	1608	--
Total	**7628**	**~550**	**6440**	**768**	**14,068**	**1318**

Table-4c. Project summary of VIVMT and park invasive plant treatment activity.

FISCAL YEAR	Treatment Activity[5]					
	VIVMT		Park		Total	
	Hours	Acres	Hours	Acres [6]	Hours	Acres
2000	2748	147	2978	145	5726	~292
2001	7628	550	6440	768	14,068	1318
Total	**10,376**	**697**	**9418**	**913**	**19,794**	**1610**

Species Controlled

VIVMT and local park staffs treated the following species during the project.

APCO – Controlled tree of heaven, princess tree, privet, multiflora rose, Japanese barberry, Japanese honeysuckle, English ivy, and Johnson grass.
BOWA – Controlled tree of heaven, kudzu, gorse, Johnson grass, Japanese honeysuckle, Japanese stiltgrass, mullein, privet, and mimosa.
COLO – Controlled kudzu, tree of heaven, princess tree, privet, Oriental bittersweet, Japanese honeysuckle, English ivy, multiflora rose, and Japanese barberry.
FRSP – Controlled multiflora rose, Japanese honeysuckle, Oriental bittersweet, periwinkle, English ivy, autumn olive, bamboo, tree of heaven, privet, and mimosa.
GEWA/THST – Controlled autumn olive, phragmites, English ivy, periwinkle, Japanese honeysuckle, privet, and tree of heaven.
PETE – Controlled tree of heaven, silver poplar, privet, autumn olive, multiflora rose, Japanese honeysuckle, Chinese wisteria, Japanese bindweed, crown vetch, and Johnson grass.
RICH – Controlled tree of heaven, privet, mimosa, autumn olive, multiflora rose, Oriental bittersweet, Japanese honeysuckle, English ivy, and mullein.
SHEN – Controlled princess tree, tree of heaven, Oriental bittersweet, kudzu, mullein, Japanese knotweed, Johnson grass, and Japanese stiltgrass.

Planting

In spite of the control emphasis, the second year of operations had site restoration at several parks in the form of planting trees, shrubs and grass in high need areas. A summary follows.

BOWA – Prepared the soil and planted native grass seed in a 1.8-acre area (made up of small and scattered parcels) that was left bare after herbicide application to control Johnson grass. Native seed included big bluestem, little bluestem, Indiangrass, and switchgrass.
PETE – Planted 47 large nursery stock cedar and pine in a 0.3-acre area of privet control. They also applied sod to a 0.1-acre portion of an earthwork treated against Johnson grass and privet.
SHEN – Broadcast native grass seed over a 10-acre area of Japanese stiltgrass site prepared by the wildfire of November 2000. Native seed included Virginia wild rye (*Elymus virginicus*), deertongue (*Dicanthelium clandestinum*), big bluestem (*Andropogon gerardii*), and switchgrass (*Panicum virgatum*).

Treatment Monitoring

The first three months of field activity (May-to-July, 2000) was highly focused on getting control efforts established and organizing local park staffs. We began installing monitoring plots in August 2000 with an eye to having field data to back up claims of initial success or need for retreatments. Botanical monitoring, database management, and photographic and GPS documentation were all part of the effort. Site data is contained in a unified database structure for each park, with fine-tuning for local park needs.

Participating Park Commitment

Notable NPS leaders in the field of invasive plant management agree that one project or one task team cannot meet the challenge of 300 years of infestation. As one said, "a SWAT team can't be a maid service that comes around, cleans up the mess and goes away. It takes team work with each park over the long haul." [7] Teamwork increases the amount of potential on-the-ground accomplishment, and it also improves the corporate memory of why, what, where, when and how things are done. The true success of all these actions depends on the sustained effort of each park beyond the project-funding period.

The coupled field involvement of park staffs with scheduled VIVMT suppression efforts was a boon to the effectiveness of the overall effort. Park involvement not only increased the amount accomplished in the field but also increased the technical expertise and corporate memory of the program. The VIVMT crew provided expertise in invasive treatment and monitoring technology, as well as person-power. Park crews provided the local knowledge so essential to keep operations on track. Maintenance divisions were essential in providing certain equipment and expertise such as for chipping/mulching cut woody material. Special commendation should go to the staffs at PETE, BOWA, GEWA, RICH and SHEN for their field involvement, though each park contributed to the effort as their time allowed.[8] What follows are brief descriptions of bright spots within the Subcluster of cooperation and innovation.

BOWA – Small But Committed

It was readily apparent from the beginning that the BOWA staff saw the NRPP project as an opportunity to get a handle on their invasives problem. They embraced the planning process and were the first to finalize their strategic plan and NEPA/NHPA clearance. They followed through in field activity as well. The interpretive/resource management and maintenance staffs participated in tree cutting, hauling of cut materials, herbicide application, treatment monitoring,

[7] Kristine Johnson (GRSM) in conversation, 1999.
[8] The Western fires of late summer 2000 impacted everyone.

and site restoration. Excellent transfer of knowledge and building of program intent to manage invasives took place. Ranger Timbo Sims did an outstanding job in forwarding the initiative.

PETE – Strong Involvement and Use of Volunteers

The staff at PETE responded with impressive staff involvement and coordinated field action as a result of the NRPP project. Their assistance during the planning phase with GIS mapping was very helpful for several parks within the Subcluster. Richard Easterbrook should be commended. Early on in the field treatment phase, the Park began using community volunteers to augment their program capacity. Considering independent park involvement and cooperation with the VIVMT team, PETE was one of the biggest programs. They are rapidly getting a handle on their invasive pest plant problems. Resources Chief Dave Shockley, Resource Management Specialist Tim Blumenschine, and Volunteer Coordinator Larry Newark made excellent contributions to the program.

COLO – Public Awareness and Collaboration

Though small in staff, COLO has created a highly visible program through public awareness initiatives and collaboration with a neighboring landowner. Very early on, Natural Resource Manager Chuck Rafkind recognized the benefit of creating site bulletins, brochures, and posters to get the word out about environmental impacts from invasive plants and to tell what the VIVMT project was attempting to do. He drafted several media items and provided digital photography that was useful throughout the Subcluster. He also initiated a collaborative effort to treat kudzu on land jointly managed by COLO and the Colonial Williamsburg Foundation. These efforts greatly helped forward the initiative in the minds of park staff and the general public.

GEWA – Earnest Commitment

Resource Management Specialist Rijk Morawe quickly embraced the NRPP initiative, recognizing its potential for addressing invasive plant impacts on the Park's delicate coastal plain environment. GEWA typifies the plight of small parks where resource management can be neglected for want of time and support. Unlike many others, however, GEWA emphasizes resource management and embraces invasive species control as a key to site restoration. They were one of the first parks to complete their strategic management plan. Through the planning process the park was able to coordinate its needs for natural and cultural resource protection.

RICH – Cooperating Divisions

The Park staff made excellent contributions to VIVMT efforts through their inter-divisional cooperation. Rangers, Maintenance, and Resource Management staffs were all involved, providing excellent assistance. Chief Ranger Mike Johnson and Natural Resource Management Specialist Kristen Gounaris did an excellent job coordinating the initiative within the Park.

APCO – Cooperating Divisions

APCO showed good initiative in its desire for installation of site monitoring plots for statistical verification of treatment effectiveness. Natural Resource Specialist Kristina Heister (now at GRBA) can be commended for her scientific approach. Maintenance Chief Roger Firth can be commended for integral involvement with VIVMT in disposing of cut material and independently treating field sites to address Johnson grass and spotted knapweed.

FRSP – Interest and Support

FRSP provided support to the VIVMT crew and helped direct field activity for effective outcomes. The Chatham Gardener and park maintenance staffs were instrumental at Chatham and Wilderness units in chipping and hauling cut materials.

SHEN – Fully Supportive

SHEN provided excellent assistance and backdrop for support of the initiative. Superintendent Doug Morris and Natural & Cultural Resources Chief Gary Somers were very supportive of the time necessary for the Project Manager to direct the project.

PUBLIC AWARENESS

Information management focused on park communications, program implementation, professional information, and media/public outreach. Through the cooperative efforts of park staffs, several brochures, posters, and media releases went out to the general and targeted public. COLO and others should be highly commended for their public relations work. As a result of joint efforts, there were many articles created for the media, including print, television, and radio. These helped increase overall public awareness of the project and the environmental impacts caused by invasive plants.

Table-5. Significant project-based information outreach.

Type of Outreach	Initiated by	Date	Description [9]
Media articles	VIVMT	10/5/99	WTOP radio
		10/00	*Appalachian Voice*
		10/29/00	*Richmond Times Dispatch*
		10/00	Elkton *Valley Banner*
		1/01	*Charlottesville Observer*
		3/01	Lynchburg *News Advance*
		6/22/01	Harrisonburg *Daily News-Record*
		7/13/01	Fredericksburg *Free Lance-Star*
Professional journals	VIVMT	1/00; 3/01; 9/01	*Southeast-EPPC News*: "NPS initiates a national effort" "SNP invasive species survey" "Controlling invasive vegetation: it's a question of vision, energy, and commitment"
Professional conferences	VIVMT	1/00	George Wright Society conference (NE Regional) **co-Chair** of invasive species concurrent session
		6/00	Mid-Atlantic Exotic Pest Plant Council's *Exotics Workshop* **speaker**

[9] Detail is available in the appendix.

(Type of Outreach)	(Initiated by)	(Date)	(Description [10])
Posters	COLO	8/00	"One park's battle in the war on exotic pest plants" – it is amendable for other parks
	VIVMT	1/00	"Building a program of exotic vegetation management" – George Wright Society Conference, Philadelphia
		4/01	"Controlling invasive vegetation at eight National Parks in Virginia" – George Wright Society Conference, Denver, CO
NPS Newsletters / Site Bulletins / Brochures	COLO	7/01	Site bulletin re: kudzu site management and collaborative effort
	VIVMT	9/01	DOI's *People, Land and Water*: "Cooperation in the war on invasives"
		10/00; 3/01	SHEN *Resource Management Newsletter*: "The VA travelling team: addressing invasives at eight National Parks"
		3/01	SHEN *Overlook*: "Invasive vegetation: the enemy was us"
		4/19/00	Media release: "Virginia National Parks cooperating to fight invasives"
Field review	SHEN	10/22/99	Hosted DOI & NPS officials to discuss invasive species management

Refer to the appendix for added detail regarding media contacts and initiatives.

PROGRAM EXPENDITURES

Expenditures largely supported the four-person crew with wages, travel support, equipment, and supplies as they worked for all eight parks within the VA-Subcluster. Activities and expenditures of the project were also aimed at increasing organizational capacity, thus creating a sustainable program of invasive vegetation control to preserve and protect park native species and resources.

To that end, a number of acquisitions directly benefited participating parks in an effort to out-plant capacity to tackle invasives. Each park was provided an invasive management "tool kit" comprising of equipment and supplies. The following table illustrates the basis of those toolkits. Each park had input to further refine the items and quantities acquired.

Additionally, parks were supplied with equipment and supplies that helped them better address their field needs for documenting invasives or helped them accomplish site restoration. For instance, BOWA and PETE purchased additional field equipment for invasive treatments. APCO, BOWA, GEWA, and PETE received additional herbicides. APCO, BOWA, and PETE acquired nursery stock and native seed for replanting treatment areas. COLO obtained a digital camera to document invasive species and project activity. FRSP, GEWA, and RICH obtained GPS units to document project sites. BOWA, COLO, and SHEN were supported to attend invasive species training conferences. Lastly, COLO, BOWA, and PETE were funded to hire employees or contract to accomplish on-the-ground invasive vegetation control and site restoration. Specifically, COLO contracted with Virginia Institute of Marine Science to create a plan and

[10] Detail is available in the appendix.

begin treating the hydric Phragmites reed that infests its wetlands. BOWA hired a laborer to treat Johnson grass, Japanese stiltgrass, and Ailanthus, as well as prepare the soil and plant native seed to capture treated areas. PETE hired two laborers to GPS proposed and active treatment sites, and deal with 17 sites of Johnson grass, Ailanthus, privet, and Japanese stiltgrass, among others.

Table-6. Participating park tool kits – augmenting organizational capacity for invasive vegetation management.

Tools / Items for Invasive Vegetation Controls	Quantity
Solo backpack sprayers (4 gal)	2
Spray drift guard	2
Kestrel 3000 weather kit	1
Chemical spill response kit	1
Eye saline kit	4
First aid kit (25 person)	1
5-gallon water cooler	1
Goggles	8
Gloves (leather)	8
Gloves (36 pair 15-mil Nitrile^{R})	1
Dust masks (2 connections)(20)	2
3M half-mask respirators	4
3M cartridges for respirators	8
Tyvek^{R} coveralls	25
Shoe booties	24
Measuring cup (1 pt)	1
Waterless hand cleaner	5
Paper towels (case)	1
Felco hand clippers	4
Felco clipper sheaths	4
Corona 26" loppers	2
Sump containment pallet (to store herbicides)	1
Garlon-4 (gallons)	10
Accord (gallons)	5
RoundUp Pro (gallons)	10
Spray blue colorant (1 gal)	1
Pesticide warning flags (100)	2
Stihl 036 Pro chainsaw (20")	1
Stihl FS85 brushcutter	1
Stihl brushcutter blade	1
Earplugs (200-count)	1
Hard hats w/ face screen	2
Chain saw chaps	2
Gas can (OSHA approved)	1
Double door storage cabinet (for equipment)	1
Action packer --48 gal size (to transport equipment to the field)	2

Table-7. Programmatic expenditures (FY 2000/01).

Expenditure Category	Organization	(%) 2000	FY 2000 ($) Expenses	(%) 2001	FY 2001 ($) Expenses
Personnel	VIVMT	22	40,446	66	118,168
	COLO/BOWA/PETE	1	1,260	4	7,458
Supplies & Materials	VIVMT	8	15,034	13	23,048
	APCO/BOWA/COLO/FRSP GEWA/PETE/RICH/SHEN	6	11,472	3	5,736
Training	VIVMT	-0-	-0-	3	5,480
	BOWA[11]/COLO	-0-	-0-	< 1	1,055
Travel	VIVMT	6	10,981	15	26,062
Equipment	VIVMT	15	26,928	2	3,763
	APCO/BOWA/COLO/FRSP GEWA/PETE/RICH/SHEN	26	48,319	4	7,173
Vehicles	VIVMT	13	24,825	-0-	-0-
Other	VIVMT	3	5,579	1	2,057
	COLO	-0-	-0-	2	5,000
Totals	**VIVMT**	**67**	**~123,949**	**87**	**~178,578**
	Direct to APCO/BOWA/COLO/FRSP GEWA/PETE/RICH/SHEN	**33**	**61,051**	**13**	**26,422**
		100	**185,000**	**100**	**205,000**

GOAL ACCOMPLISHMENTS

FY 2000/01 Accomplishments Combined

- Control of invasive vegetation at all eight parks amounting to 422 acres. (See tables 3 & 4.)
- Site restoration at three parks (planting/seeding native species) amounting to 12.1 acres. (See the Site Restoration: Planting subsection.)
- Strategic plans and specific site clearance created for all eight parks. Strategic plans include species/zonal prioritization, NEPA/NHPA clearance, monitoring protocols, safety & communications plans, best management practices statements, and initial treatment scheduling. (See the Park Assessments & Planning section.)
- Mobilized park staffs at each park to effectively identify current and potential highly invasives plants. Trained and transferred technical knowledge of invasive control techniques, monitoring, and safety issues. (See the Park Assessments & Planning section.)
- Increased organizational capacity through purchase of essential tools, supplies, and training, as well as by transfer of knowledge and program intent as listed above. (See the Program Expenditures section.)
- Increased public awareness through a series of articles, posters, speeches, and media handouts. These efforts were aimed at the general public, park neighbors, professional peers, and in-park staff. Avenues of dissemination of information were through the public media, professional journals, and park publications. (See the Public Awareness section.)

[11] Including travel to training site.

Tasks Remaining into FY 2002

- Convey field data to participating parks, including site records, databases, ArcView shape files, and photography.
- Coordinate with all parks to schedule continuing field visits for invasive controls and monitoring into FY 2002 and beyond. (Limited BRMD funds are available into FY 2002.) Remain available for consultation on particular invasive plant problems.
- Establish monitoring plots at FRSP.
- Continue initial and follow-up invasive controls at all parks.

CONCLUSIONS

The NRPP-funded VA-Cooperative proved very successful. Through it eight parks garnered outside invasives expertise. Eight parks began cooperating with one another on the issues of site restoration and invasive species management, tackling the difficult job of assessing, treating, and monitoring their invasive problems. Perhaps we were all surprised by the enthusiasm experienced in the effort. Funding allowed us to increase organizational capacity for future invasive management at each park. Together, the funding, expertise, and cooperation enabled us to attempt creating park programs to control the impacts of invasives on our natural and cultural resources. Time will tell whether the effort is sustainable. There are elements that indicate that *is* the case. As the problem of alien invasives is large, it will take a sustained campaign to reduce targeted species to manageable levels in our parks. We seek on-going NPS support and involvement as we continue our efforts.

Submitted October 19, 2001
James Åkerson, Project Manager

Appendix

Appendix-Table-1. Targeted alien invasive plant species (ordered by common name).

Common Names	Species
Autumn olive	*Elaeagnus umbellata*
Bamboo	*Phyllostachys aurea*
Crowned vetch (trailing vetch)	*Coronilla varia*
English ivy	*Hedera helix*
Fescue	*Festuca arundinacea*
Giant mullein	*Verbascum thapsus*
Gorse	*Ulex europaeus*
Japanese barberry	*Berberis thunbergii*
Japanese honeysuckle	*Lonicera japonica*
Japanese knotweed	*Polygonum cuspidatum*
Japanese stiltgrass (eualia)	*Microstegium vimineum*
Johnson grass	*Sorghum halepense*
Kudzu	*Pueraria lobata*
Mimosa tree	*Albizia julibrissen*
Moth mullein	*Verbascum blattaria*
Multiflora rose	*Rosa multiflora*
Orchard grass	*Dactylis glomerata*
Oriental bittersweet	*Celastrus orbiculatus*
Periwinkle	*Vinca minor & v. Major*
Phragmites (common reed)	*Phragmites australis*
Princess-tree (royal paulownia)	*Paulownia tomentosa*
Privet	*Ligustrum sinense*
Tall (or meadow) fescue	*Festuca elatior*
Timothy	*Phleum pratense*
Tree of heaven	*Ailanthus altissima*
Wisteria (Chinese or Asian wisteria)	*Wisteria sinensis*

Appendix-Table-2. Example outline of Virginia-Subcluster invasive species strategic management plans.

STRATEGIC PLAN FOR MANAGING ALIEN INVASIVE VEGETATION

CONTEXT & SCOPE
- [Law, regulation, policy, and overarching planning documentation implications]

INVASIVE PLANTS & APPROPRIATE ACTION
- CHARACTERISTICS OF INVASIVE VEGETATION
- IMPLICATIONS & WARNINGS FOR LAND MANAGERS
- ESTABLISHING A PROGRAM OF INVASIVE CONTROLS
- APPROPRIATE FIELD CONTROLS

RECONNAISSANCE SUMMARY
- [Species-specific descriptions]

ANALYSIS OF ALIEN THREATS
- SPECIES RANKING
- ZONES OF SPECIAL NEED FOR PROTECTION
- SPECIES WATCH LIST

INVASIVE MONITORING

PROGRAM IMPLEMENTATION
- CONSOLIDATED TREATMENT SCHEDULE
- SITE RESTORATION

REFERENCES

APPENDICES
- TREATMENT SCHEDULE
- TREATMENT PROTOCOLS [gathered BMPs]
- ALIEN TREAT/CONTROL RANKING SHEETS
- MONITORING PROTOCOLS
- SAFETY & COMMUNICATIONS PLAN
- NEPA/NHPA COMPLIANCE
- MAPS
- ADDENDA

FIGURES & TABLES (interspersed within the text)
- HIERARCHY OF LAW AND POLICY [figure]
- RANKING OF INVASIVE VEGETATION [figure]
- SUMMARY OF THREAT & CONTROL POTENTIALS [table]
- ZONES OF CAUTION NEEDED TO PROTECT RESOURCES [table]
- SPECIES OR ZONES REQUIRONG SPECIFIC CLEARANCE PRIOR TO TREATMENT [table]
- WATCH LIST OF POTENTIAL HIGHLY INVASIVE SPECIES [table]

Appendix-Table-3. VIVMT field activities – FY 2000.

Payperiod	Park	Task	10-Hr. Person-Days	Acres [12]	
FY 2000				(Treated plus re-treated)	
10	---	Orientation & training	8	NA	
10	SHEN	Control: Asian bittersweet	8	4	
11	BOWA	Control: Ailanthus, kudzu, gorse	10	8	
11	GEWA	Control: autumn olive, periwinkle, Ailanthus	8	5	
12	PETE	Control: Ailanthus, Johnson grass	8	1	
12	SHEN	1 holiday plus control of Asian bittersweet	2+6	6	
13	---	Fire training	2	NA	
13	COLO	Control: Ailanthus, princess tree	8	2	
13-14	PETE	Control: Ailanthus, privet, Johnson grass, multiflora rose, Oriental bittersweet	16	44	
14	FRSP	Reconnaissance plus control of multiflora rose, Oriental bittersweet, J. honeysuckle	8	< 1	
15	---	1 holiday plus VIVMT data entry	2+5	NA	
15-16	FRSP	Control: Ailanthus, multiflora rose, Oriental bittersweet, J. honeysuckle	20	13	
16	BOWA	Control: Ailanthus, Johnson grass, kudzu, mimosa	16	33	
17	APCO	Reconnaissance & planning	17	--	
17-18	COLO	Control: Ailanthus, princess tree	32	5	
18-19	GEWA	Control: Phragmites, autumn olive, Ailanthus	24	6	
19-20	RICH	1 holiday plus control of Ailanthus, privet, mimosa, autumn olive, mullein, Oriental bittersweet	4+28	4	
20	APCO	Pre-control monitoring set-up, plus control of Ailanthus, princess tree, privet, multiflora rose	12	5	
21a	BOWA	Control: Ailanthus, Japanese stiltgrass, plus treatment monitoring	12	7	
21a	---	VIVMT data entry	2	NA	
			10-hour Person-Days	**Treat**	**Re-treat**
---	---	**Fiscal Year 2000 End Totals**	**258**	**137**	**9**
		Treatment Total		**~147**	
	APCO		29	5	--
	BOWA		38	47	8
	COLO		40	6	--
	FRSP		28	13	--
	GEWA		32	11	< 1
	PETE		24	45	< 1
	RICH		28	4	--
	SHEN		14	6	--
	VIVMT	Administrative, training, data entry	**25**	--	

[12] Acres are greater than earlier reported due to GPS area updating of treatment sites.

Appendix-Table-4. VIVMT field activities – FY 2001.

Payperiod	Park	Task	10-Hr. Person-Days	Acres
FY 2001				(Treated plus re-treated)
21b	---	VIVMT data entry	16	NA
22	SHEN	1 holiday plus control of princess tree and Ailanthus	4+12	21
22-23	PETE	Control: Ailanthus, vetch, privet, Japanese honeysuckle, multiflora rose, Johnson-grass	32	78
23	---	VIVMT data entry	8	NA
23	SHEN	Control: princess tree, Ailanthus	8	4
24	APCO	1 holiday plus monitoring and GPS	4+12	--
24-25	RICH	1 holiday plus control of Ailanthus, mimosa, Oriental bittersweet, privet, J. honeysuckle	4+28	14
25	GEWA	Control: autumn olive	16	4
26	COLO	1 staff meeting @SHEN plus control of Ailanthus, princess tree, privet	4+12	3
26-01	FRSP	Control: Ailanthus, autumn olive, privet, Asian bamboo	32	3
01-02	SHEN	2 holidays plus control of princes tree and Ailanthus	8+40	25
03	---	**Staff furlough**	---	NA
04	SHEN	Control: princess tree and Ailanthus	16	5
04-05	PETE	1 holiday plus control of Ailanthus, autumn olive, privet, J. honeysuckle, white poplar, multiflora rose, wisteria	4+28	43
05-06	RICH	Control: Ailanthus, English ivy, privet, J. honeysuckle	32	10
06-07	GEWA	Control: autumn olive, E. ivy, privet, periwinkle, Ailanthus	30	15
07	THST	Reconnaissance plus control of Ailanthus	2	< 1
07-08	FRSP	Control: Ailanthus, privet, multiflora rose	32	11
08-09	COLO	Control: Ailanthus, princess tree, J. barberry, Oriental bittersweet, E. ivy, privet, J. honeysuckle	32	26
09	---	VIVMT data entry plus attendance at George Wright Society plus ArcView training	7+3+6	NA
10	BOWA	Control: gorse, J. honeysuckle	16	5
10-11	APCO	Control: Ailanthus, princess tree, J. barberry, privet, J. honeysuckle, multiflora rose	24	29
11-12	---	VIVMT data entry	16	NA
12-13	RICH	1 holiday plus control of Ailanthus, mimosa, Oriental bittersweet, autumn olive, privet, J. honeysuckle, multiflora rose	2+14	23
13	---	Employee orientation	4	NA
13-14	PETE	Control: Ailanthus, white poplar, privet, autumn olive, J. honeysuckle, multiflora rose, Johnson grass	32	49
14-15	GEWA	1 holiday plus control of Ailanthus, autumn olive, privet, periwinkle, Asian bamboo, J. honeysuckle	4+28	27

(Payperiod)	(Park)	(Task)	(10-Hr. Person-Days)	(Acres)	
15-16	FRSP	Control: Ailanthus, mimosa, autumn olive, privet, Asian bamboo, E. ivy, multiflora rose, J. honeysuckle, periwinkle	32	27	
16-17	COLO	Control: kudzu, Ailanthus, E. ivy, privet, Oriental bittersweet, multiflora rose	32	32	
17	BOWA	Control: Ailanthus, privet, J. stiltgrass, gorse	16	61	
18	---	VIVMT data entry	16	NA	
18-19	APCO	Control of Ailanthus, princess tree, privet, J. barberry, E. ivy, multiflora rose, Johnson grass	32	47	
19-20	SHEN	1 holiday plus control of Oriental bittersweet, princess tree	4+36	17	
20-21a	---	VIVMT equipment maintenance plus data entry	8+8	NA	
			10-hour Person-Days	**Treat**	**Re-treat**
---	---	**Fiscal Year 2001 End Totals**	**763**	**271**	**281**
		Treatment Total	--	**~550**	
	APCO		68	42	34
	BOWA		32	20	46
	COLO		76	31	30
	FRSP		96	14	27
	GEWA		74	19	27
	PETE		92	76	94
	RICH		74	24	23
	SHEN		88	45	--
	THST		2	< 1	--
	VIVMT	Administrative, training, data entry	161	---	

NRPP GRANT FUNDING

Representing the VA-Subcluster, SHEN forwarded a 2-year $390K proposal into the FY 2000/2001 Unified Call, May 1999. (Though the Subcluster had earlier requested 3-year funding, the NER realized that the added funding cost was beyond their capability to support, and therefore recommended the smaller proposal package.) NER approved the project via John Karish, August 31, 1999. The Project Manager drafted the required *Detailed Implementation Plan*, obtained review comments from participating park contacts, and submitted the final version to Gary Johnston, WASO, on October 4, 1999. After one round of questions and answers, Mr. Johnston forwarded general WASO approval via ccMail on January 13, 2000. Funds became available for use at the park level in early March 2000; $185K for FY 2000, with $205K earmarked for FY 2001. The Project Manager has submitted progress reports on two occasions, including this one and one dated October 2, 2000.

PERSONNEL

The VIVMT field crew was composed of Crew Leader Matthew Patterson, Assistant Crew Leader Norman Forder, and two crewmembers. Appendix-Table-5 summarizes personnel actions during the project. The leaders (term STF) remained 37 pay periods (the entire project), whereas the crewmembers were composed of two term STF employees that remained 22 pay periods, until resigning, and then by two seasonal employees for eight pay periods. Appendix-Table-6 summarizes the effective available time devoted to the project. Available time was notably far less than the potential for two years.

Appendix-Table-5. VIVMT personnel actions.

Date	Actions
11/1999	Began preparing GS-404-5/6 PDs, vacancy announcement, KSAs, etc.
2/16-to-3/1/00	First announcement period via OPM & USAJobs (four term vacancies; GS-5&6)
4/24/00	Two term Biological Science Technicians reported for work; one GS-6 Crew Leader (Matthew Patterson) and one GS-5 Crewmember (Norman Forder)
5/10-to-5/24/00	Second announcement period via OPM & USAJobs (two term vacancies; GS-5)
7/16/00	Two term Biological Science Technicians reported for work; GS-5 crew-members (Carolyn Davis and Zachary Bolitho)
1/14-to-1/27/01	Crew furlough (term STF employees)
5/5/01	Two GS-5 crewmembers resigned (Carolyn Davis and Zachary Bolitho)
6/3/01	Two seasonal Biological Science Technicians, hired from an open SHEN announcement., reported for work; GS-5 crewmembers (Ian Passwaters and Jesse Passwaters)
6/11-to-6/22/01	Third announcement period via OPM & USAJobs (two term vacancies; GS-6)
7/29/01	Two term Biological Science Technicians reported for work; GS-6 Assistant Crew Leaders (Norman Forder and Ronald Nemes)
9/30/01	End of project

Appendix-Table-6. VIVMT staff time available during FY 2000/01.

Staffing Items	FY 2000 person-hours	FY 2001 person-hours	Total person-hours	%-Total
Virtual person-hours available per year (4 people)	**8348**	**8348**	**16,696**	**100**
Actual person-hours available	**2748**	**7628**	**10,376**	**62**
Events/actions leading to the difference –				
FY 2000 funding not available until March 2000	(3680)	---	(3680)	(22)
1st hiring process	(960)	---	(960)	(6)
2nd hiring process	(960)	---	(960)	(6)
Crew furlough (one pay period for four people)	---	(320)	(320)	(2)
Two employees resigned; 3rd hiring process	---	(320)	(320)	(2)
Two employees resigned prior to project end	---	(80)	(80)	(< 1)
Total events/actions	**(5600)**	**(720)**	**(6320)**	**(38)**

PUBLIC AWARENESS

Substantive public information actions for the VIVMT project included:

FY 2000

- External – Project Manager (PM) was interviewed by Howard Dykus, WTOP radio, October 5, 1999.
- Internal – PM participated in NER meeting of staff specialists on regional invasive vegetation management concerns, held at ACAD, October 13-14, 1999.
- Internal – SHEN hosted Washington-level DOI and NPS officials on invasives at SHEN, including Bill Brown, Gordon Brown, and Pat Shay, October 22, 1999.
- External – PM wrote article published in the winter 2000 issue *Southeast-EPPC News* titled "NPS Initiates A National Effort."
- Internal (but broad) – PM co-chaired concurrent session on invasive species management at the NER - George Wright Society meeting, held at VAFO, January 19-20, 2000.
- Internal (but broad) – PM created poster for the NER - George Wright Society meeting held at VAFO, January 19-20, 2000, titled "Building A Program Of Exotic Vegetation Management."
- Internal – PM sat as a member of NPS National Alien Invasive Evaluation Panel to divide Natural Resource Challenge monies on invasive species control, held at Tucson, AZ, February 15-16, 2000.
- External – PM presented a talk at the Mid-Atlantic Exotic Pest Plant Council's Exotics Workshop titled "Parklands Need Invasive Vegetation Control," held in Ft. Meade, MD, June 8, 2000.
- External – Chuck Rafkind-COLO released poster titled, "One Park's Battle in the War on Exotic Pest Plants," August 2000, featuring the work of the VA-Cooperative. (It may be tailoring to the other seven parks.)
- External – PM wrote media release April 19, titled, "Virginia National Parks Cooperating to Fight Invasives."
- External – PM drafted poster titled, "WANTED: For The Destruction Of Native Habitat…" August 2000.

FY 2001

- Internal (but broad) – PM wrote lead article published in the SHEN Fall 2000 *Resource Management Newsletter*, titled "The Virginia Travelling Team: Addressing Invasives at Eight National Parks" October 2000.
- External – PM interviewed by Shireen Parson of *Appalachian Voice* for an exotics article that ran in the winter 2001 issue.
- External – PM and VIVMT crew interviewed with on-site photography by Calvin Trice, *Richmond Times Dispatch*, for an article on the VIVMT that ran in the Sunday, October 29, 2000, issue.

- External – PM interviewed by Charlie Knight, Elkton *Valley Banner*, for an exotics article in October 2000.
- External – PM interviewed by Marlene Condon, nature columnist for the *Charlottesville Observer*, on impacts of invasives, January 2001.
- External – PM wrote article for the *Southeast-EPPC News*, titled "SNP Invasive Species Survey" that was published in the spring 2001 issue.
- External – PM interviewed by Shannon Brenner, Lynchburg *News Advance* on VIVMT activity and invasive plant impacts, March 2001.
- Internal (but broad) – PM wrote two articles published in the SHEN spring 2001 *Resource Management Newsletter*, titled "The SHEN invasive vegetation survey" and "Invasive vegetation: innocence turned sour," March 2001.
- External – PM wrote article published in the Shenandoah National Park *Overlook* titled "Invasive Vegetation: the Enemy Was Us," March 2001.
- External – PM and staff interviewed on video regarding role of invasive plant control in Big Meadows site restoration, March 2001.
- Internal (but broad) – PM and VIVMT crew drafted and presented poster and poster paper at George Wright Conference in Denver, CO, titled "Controlling Invasive Vegetation at Eight National Parks in Virginia" April 2001.
- External – PM and SHEN crew interviewed and photographed by Nicole Casal, Harrisonburg *Daily News-Record* for an article on invasive plant impacts that ran June 22, 2001.
- External – PM wrote article for the *Southeast-EPPC News*, titled "Innocence turned sour," April 2001.
- External – VIVMT crew interviewed by Frank Delano, Fredericksburg *Free Lance-Star* for an article with photographs that ran July 13, 2001.
- External – PM wrote article for the *Southeast-EPPC News* and SNP *Resource Management Newsletter*, titled "Controlling Invasive Vegetation: It's A Question of Vision, Energy, and Commitment" to be published in the fall 2001 issues.
- External – Chuck Rafkind-COLO released a site bulletin regarding kudzu control on lands jointly managed by COLO and the Colonial Williamsburg Foundation, July 2001.
- Internal (but broad) – PM drafted article and sidebars for the Department of the Interior's *People, Land and Water* magazine titled, "Cooperation in the War on Invasives" about the collaborative effort to control kudzu on COLO/Colonial Williamsburg Foundation lands under the auspices of VIVMT; it is to be published in the October-November 2001 issue.
- Attempted a media event with Secretary Norton on invasive species issue, September 29, 2001. Though there was initial assent and interest by the Secretary, she limited her scheduled time at SHEN and did not conduct the interview. The contacts made within NPS and the Department will be valuable in the future.